

REMARKS

As a preliminary matter, Applicant appreciates the Examiner's indication that the Election of Species Requirement between Claims 11-16 has been withdrawn, and that Claims 11-16 have been examined.

Claims 11-15 stand rejected under 35 U.S.C. §103 as being unpatentable over United States Patent No. 6,781,759 to Wakita et al. in view of United States Patent No. 6,137,556 to Yamahara. Applicants respectfully traverse this rejection.

In this rejection, the Examiner relied upon the Yamahara reference for the claimed ranges of the ratio R_f/R_{lc} . More specifically, the Examiner cited to column 15, lines 42-60 and column 37, lines 15-25 of Yamahara for this feature. However, these sections of Yamahara discuss ratios between a variation in the refractive index anisotropy of the liquid crystal and a variation in the refractive index anisotropy of the retardation plate. In contrast, independent Claims 11, 12 and 13 each define a ratio between retardation of the retardation plate and retardation of the liquid crystal. Thus, the ratios referred to by the Examiner relate to different subject matter than the ratios defined in independent Claims 11, 12 and 13. Accordingly, for at least this reason, Applicants respectfully request the withdrawal of this §103 rejection of independent Claims 11, 12 and 13 and associated dependent Claims 14 and 15.

In addition, Applicants also request the withdrawal of this rejection for the following additional reasons. The Examiner indicates that the Wakita et al. reference discloses a reflecting layer having projections and depressions formed on a surface thereof, a

liquid crystal layer, and a retardation plate and a polarizing plate, which are components common to independent Claims 11-13 of the present application, and further, the Examiner mentions that it would have been obvious to one of ordinary skill in the art to have an average tilt angle of the projections and depressions of a value of not less than 4° nor greater than 6° (as defined in Claim 11), and not less than 7° nor greater than 9° (as defined in Claim 12), and not less than 10° nor greater than 15° (as defined in Claim 13).

In addition, the Examiner indicates that Yamahara discloses a vertical alignment liquid crystal molecule and a retardation plate having a negative refractive index anisotropy in a vertical direction, and that Yamahara also discloses a ratio between a retardation R_f of the retardation plate and a retardation R_{lc} of the liquid crystal layer, R_f/R_{lc} .

However, in Claims 11-13 of the present application, the average tilt angle of the projections and the depressions of the reflecting layer and the ratio R_f/R_{lc} are not separately limited, but they are limited on the basis of the relationship between both of them.

In other words, as described in detail in “principle configuration 1,” “principle configuration 2,” and “principal configuration 3” of the present specification:

Regarding Claim 11, when the average tilt angle of the reflecting projections and depressions is not less than about 4° nor greater than about 6° , light emitted at an observation angle of 0° (in the substrate vertical direction) is incident on/emitted from the liquid crystal layer at a shallow angle of not less than about 0° nor greater than about 12° , so that the optimal retardation is small, while light emitted at an observation angle of 45° is

incident on/emitted from the liquid crystal layer at a deep angle of not less than about 16° nor greater than about 28° , so that the optimal retardation is large. When the optimal retardation greatly differs depending on the observation angle as described above, it is preferable to set a retardation plate in conformity to the larger retardation. This leads to excessive compensation at the observation angle of 0° to cause black floating, but the light emitted at the observation angle of 0° is incident on the liquid crystal layer at a shallow angle, so that the retardation due to the excessive compensation is also small, resulting in little influence. In this way, finding the optimal retardation R_f from the observation angle which causes a large retardation and the average tilt angle of the reflecting projections and depressions results in substantially $0.6 \leq R_f/R_{lc} \leq 0.9$.

Regarding Claim 12, by the same consideration as the above, when the average tilt angle of the reflecting projections and depressions is not less than about 7° nor greater than about 9° , finding the optimal retardation R_f results in substantially $0.5 \leq R_f/R_{lc} \leq 0.8$.

Regarding Claim 13, by the same consideration as the above, when the average tilt angle of the reflecting projections and depressions is not less than about 10° nor greater than about 15° , finding the optimal retardation of R_f results in substantially $0.4 \leq R_f/R_{lc} \leq 0.7$.

Claims 11-13 of the present application do not assert difficulty in establishing an average tilt angle of the projections and depressions in the reflecting layer, but claims the optimal ranges of the ratio of R_f/R_{lc} in accordance with an average tilt angle of the

projections and depressions concretely, on the basis of the relationship between the average tilt angle of the projections and depressions and the ratio R_f/R_{lc} .

Although the Examiner indicates that Yamahara mentions a ratio R_f/R_{lc} , Yamahara discusses a ratio between a variation in the positive refractive index anisotropy of the liquid crystal and a variation in the negative refractive index anisotropy of the retardation plate, and specifies the relationship between a pretilt angle of the liquid crystal and a principal refractive index of the retardation plate. Accordingly, Yamahara fails to discuss the ratio R_f/R_{lc} as in the present invention or to specify the relationship between the average tilt angle of the projections and depressions and the ratio R_f/R_{lc} .

Further, Yamahara specifies a range of the principal refractive index of the retardation plate by compensation for wavelength dispersion by using a ratio of refractive index anisotropy between different wavelengths, whereas the present invention specifies the range of the retardation between a liquid crystal and a retardation plate by compensating the retardation.

In Claims 11-13 of the present invention, as explained in principle configuration 1, considering that R_f of the retardation plate changes in proportion to the retardation R_{lc} of the liquid crystal layer, R_f is expressed through the ratio with respect to the retardation R_{lc} , which is obtained from the cell thickness and the birefringence difference of the liquid crystal layer, and the ratio R_f/R_{lc} is limited strictly on the basis of the relation with the average tilt angle of the projections and depressions in the reflecting layer.

Neither of Wakita nor Yamahara raises awareness of the ratio R_f/R_{lc} (there is no indication of the ratio R_f/R_{lc}), therefore, they do not discuss the ratio R_f/R_{lc} on the basis of the relation with the average tilt angle of the projections and depressions in the reflecting layer. Even if Wakita and Yamahara are combined, the combination does not reach the invention recited in Claims 11-13. Thus, for at least these reasons this §103 rejection of independent Claims 11-13 and associated dependent Claims 14 and 15 should be withdrawn.

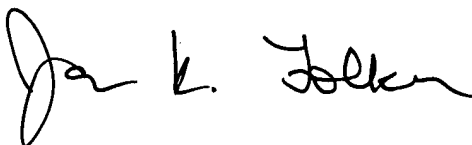
Claims 16 stands rejected under 35 U.S.C. §103 as being unpatentable over United States Patent No. 6,781,759 to Wakita et al. in view of United States Patent No. 6,137,556 to Yamahara and further in view of United States Patent No. 6,226,064 to Shimada et al. Applicants respectfully traverse this rejection.

Claim 16 depends from independent Claim 11, and therefore includes all of the features of Claim 11, plus additional features. Accordingly, Applicants respectfully request that this §103 rejection of dependent Claim 16 be withdrawn considering the above remarks directed to independent Claim 11, and also because the Shimada et al. reference does not remedy the deficiencies noted above, nor was it relied upon as such.

For all of the above reasons, Applicants request reconsideration and allowance of the claimed invention. Should the Examiner be of the opinion that a telephone conference would aid in the prosecution of the application, or that outstanding issues exist, the Examiner is invited to contact the undersigned.

Respectfully submitted,

GREER, BURNS & CRAIN, LTD.

By 

James K. Folker

Registration No. 37,538

July 5, 2006

Suite 2500
300 South Wacker Drive
Chicago, Illinois 60606
(312) 360-0080
Customer No. 24978

P:\DOCS\111768737\AF0675.DOC